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Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

Sub-Committee of Experts on the Transport of Dangerous Goods

Forty-fifth session
Geneva, 23 June – 2 July 2014
Item 3 of the provisional agenda
Global Harmonization of transport of dangerous goods regulations with the Model Regulations

Packagings for water-reactive materials

Transmitted by the expert from Germany[1]

Introduction

1. During the last session, the Sub-Committee took note of International Maritime Organization's (IMO) decision to strengthen the provisions on packagings for substances which react dangerously with water (see ST/SG/AC.10/C.3/2013/41 together with informal documents INF.3, INF. 4 and INF.5).

2. Some experts expressed their concerns regarding the associated deviations from the Model Regulations. However, the Sub-Committee also confirmed that it was legitimate for IMO to take into account the specific risks associated with sea transport. The Guiding Principles expressly provide for the possibility that stricter packing provisions may be necessary for individual modes of transport.

3. It was agreed that based on a new proposal a decision should be taken regarding the relevance to other modes of transport, and it was suggested that provisions relevant only to sea transport be introduced in the Model Regulations and identified as such.

[1] In accordance with the programme of work of the Sub-Committee for 2013-2014 approved by the Committee at its sixth session (refer to ST/SG/AC.10/C.3/84, para. 86 and ST/SG/AC.10/40, para. 14).

Current differences between the International Maritime Dangerous Goods Code (IMDG Code) and the Model Regulations

4. There are already differences in terms of the assignment of special packing provisions PP31 and PP40.

5. Whereas in the Model Regulations packing provision PP31 only applies to a single entry, namely UN No. 1131 (Class 3 subsidiary risk 6.1), it applies to a multitude of further entries in the IMDG Code (*in Divisions 4.1, 4.2, 4.3 and 6.1 as well as one substance UN 2626 in Division 5.1).* These UN Nos. are as follows: 1183, 1242, 1295, 1310, 1321, 1322, 1326, 1336, 1337, 1339, 1340, 1341, 1343, 1344, 1347, 1348, 1349, 1352, 1354, 1355, 1356, 1357, 1358, 1360, 1362, 1373, 1374 PG II and III, 1378, 1379, 1381, 1382, 1383, 1384, 1385, 1389, 1390, 1391, 1392, 1393, 1394, 1397, 1400, 1401, 1402, 1405 PG II und II, 1407, 1409 PG I, 1410, 1413, 1414, 1415, 1417, 1418 PG I, 1419, 1420, 1421, 1422, 1423, 1426, 1427, 1428, 1432, 1433, 1437,1463, 1517, 1553, 1565, 1571, 1575, 1626, 1680, 1689, 1693 PG I and II, 1694, 1698, 1699, 1701, 1714, 1854, 1855, 1868, 1870, 1871, 1889, 1923, 1929, 1932, 2004, 2008 PG I, II and II, 2009, 2010, 2011, 2012, 2013, 2257, 2318, 2463, 2471, 2478 PG II and III, 2545 PG I, II and III, 2546 PG I, II and III, 2555, 2556, 2557, 2604, 2624, 2626, 2785, 2805, 2806, 2813 PG I, II and III, 2830, 2835, 2844, 2845, 2846, 2852, 2881 PG I, II and III, 2940, 2965, 2988, 3048, 3078, 3088 PG II and III, 3148 PG I, II and III, 3170 PG II and III, 3174, 3181 PG II and III, 3182 PG II and III, 3183 PG II and III, 3184 PG II and III, 3185 PG II and III, 3186 PG II and III, 3187 PG II and III, 3188 PG II and III, 3189 PG II and III, 3190 PG II and III, 3200, 3205 PG II and III, 3206 PG II and III, 3208 PG I, II and III, 3209 PG I, II and III, 3317, 3341 PG II and III, 3342 PG II and III, 3364, 3365, 3366, 3367, 3368, 3369, 3376, 3398 PG I, II and II, 3399 PG I, II and II, 3401, 3402, 3403, 3404, 3413 PG I, II and III, 3414 PG I, II and III, 3448 PG I and II, 3449, 3450 and 3482. The existing stricter provisions of the IMDG Code were converted to the new common format within the framework of the structural reform.

6. PP40 is only assigned to six entries in the Model Regulations (UN Nos. 1326, 1352, 1358, 1437, 1871, 3182). In the IMDG Code, it additionally applies to the following entries: UN Nos. 1340, 1374 PG II, 1378, 1382, 1390, 1393, 1394, 1396 PG II, 1400, 1401, 1402 PG II, 1405 PG III, 1409 PG II, 1417, 1418, 1436 PG II, 2624, 2805, 2813 PG II, 2830, 2835, 3078, 3131 PG II, 3132 PG II and III, 3134 PG II, 3170 PG II and 3208 PG III.

Future amendments to the packing instructions in the IMDG Code

7. For amendment 37 of the IMDG Code, further amendments with regard to the packing provisions are planned. The background of this is a research project entitled "The Safe Sea Transport of Dangerous Goods which react dangerously with Water and/or Carbon Dioxide" (see INF. 3 and INF.4 of 44th session) commissioned by the German Ministry of Transport. The project systematically investigated the sea transport of substances which react dangerously with water. These are those substances that are assigned Emergency Schedule F-G in Table 3.2 of the IMDG Code; these are entries assigned to Divisions 4.1, 4.2, 4.3 and 5.1.

8. In line with the recommendations of the research project, Germany proposed to IMO measures regarding the fire protection equipment, the adaptation of the Emergency Response Procedures for Ships Carrying Dangerous Goods (the EmS Guide), additions to the training for fire fighting and the adaptation of the provisions on stowage, segregation, loading and packaging in the IMDG Code (see INF.5, 44th session). The proposed

amendments were adopted at the 17th session of the IMO Sub-Committee on Carriage of Cargoes and Containers (CCC) (formely DSC) and – to the extent that they concern the IMDG Code – included draft amendment 36. Only the amendments regarding the packing provisions were postponed to a later date following the discussion in the IMO Editorial and Technical Group to permit a discussion in the TDG Sub-Committee beforehand.

9. Within the framework of the study, the influence of water as one of the significant risks (deductive and inductive) was identified.

10. Moisture in a container may contribute to causing a fire in connection with dangerous goods (deductive risk). Depending on the packaging properties, condensation water may soak the packaging so that the dangerous good comes into contact with water and triggers a dangerous reaction. In particular dangerous goods of Division 5.1 (e.g. potassium persulfate) may react with sodden organic packaging material (paper, cardboard) and ignite. Moreover, air humidity may also be relevant: Some goods in liquid form are transported in tanks or drums with pressure-relief devices. Small amounts of dangerous flammable gases may escape through these devices. If the humidity in the container is high and the concentration of dangerous gases in the air reaches a critical level, a reaction may occur and the mixture of gas and air may ignite spontaneously. Another possible risk is the formation of corrosive substances which corrode the structure of the container and the ship. Water may also enter into the container during transport, e.g. through the ventilation system, particularly in heavy seas, as well as in the case of leaks and collisions.

11. Water-related risks are particularly relevant in sea transport: in addition to the ingress of sea water, air humidity and condensation result in difficulties more frequently than in other modes of transport due to the in some cases long voyage durations and the different climatic zones. Usually, sea water is the only available extinguishing agent, which is used both for fires in containers with substances reacting dangerously with water and for the other adjacent containers. Moreover, it has to be taken into consideration that, unlike in air transport, it is permitted to use packagings with venting devices. Accordingly, stricter packing provisions already apply to many of the examined substances in the IMDG Code.

12. Thus, the risks are different in sea transport than in other modes of transport. Therefore, it would not be justified to introduce these stricter packing provisions multimodally. However, the additional requirements for sea transport do not preclude carriage with other modes of transport; thus, packagings in accordance with the IMDG Code also permit multimodal transport.

Solution

13. To reflect the multimodal character of the Model Regulations, the additional requirements that apply to sea transport should also be contained in the Model Regulations. For this purpose, packing provisions formulated specifically for sea transport should be assigned to entries that are assigned packing provision PP31 or PP41 only in the IMDG Code: "PP xx For sea transport of UN Nos. ... packagings shall be hermetically sealed." and "PP yy For sea transport of UN Nos. ... bags are not allowed." For the packing provisions for large packagings and IBCs provided in ST/SG/AC.10/C.3/2013/41, too, special packing provisions formulated specifically for sea transport should be added to the Model Regulations.

14. In addition, the text of the Guiding Principles should be supplemented to illustrate which amendments have been made.

Proposals

Proposal 1: Amendment of packaging provisions

Packagings

Table 3.2, Column 9:

Insert a new PPxx "For sea transport of UN Nos. ... packagings shall be hermetically sealed." against the following entries:

1183, 1242, 1295, 1310, 1321, 1322, 1326, 1336, 1337, 1339, 1340, 1341, 1343, 1344, 1347, 1348, 1349, 1352, 1354, 1355, 1356, 1357, 1358, 1360, 1362, 1373, 1374 PG II and III, 1396 PG II,1378, 1379, 1381, 1382, 1383, 1384, 1385, 1389, 1390, 1391, 1392, 1393, 1394, 1395, 1396 PG III, 1397, 1398, 1400, 1401, 1402 PG I and II, 1403, 1405 PG II and II, 1407, 1409 PG I and II, 1410, 1413, 1414, 1415, 1417, 1418 PG I, II and III, 1419, 1420, 1421, 1422, 1423, 1426, 1427, 1428, 1432,1433, 1436 PG I, II and III, 1437, 1463, 1517, 1553, 1565, 1571, 1575, 1626, 1680, 1689, 1693 PG I and II, 1694, 1698, 1699, 1701, 1714, 1854, 1855, 1868, 1870, 1871, 1889, 1923, 1929, 1932, 2004, 2008 PG I, II and II, 2009, 2010, 2011, 2012, 2013, 2257, 2318, 2463, 2471, 2478 PG II and III, 2545 PG I, II and III, 2546 PG I, II and III, 2555, 2556, 2557, 2604, 2624, 2626, 2785, 2805, 2806, 2813 PG I, II and III, 2830, 2835, 2844, 2845, 2846, 2852, 2881 PG I, II and III, 2940, 2965, 2988, 3048, 3078, 3088 PG II and III, 3131 PG II and III, 3132 PG II and III, 3134 PG II and III, 3135 PG II and III, 3148 PG I, II and III, 3170 PG II and III, 3174, 3181 PG II and III, 3182 PG II and III, 3183 PG II and III, 3184 PG II and III, 3185 PG II and III, 3186 PG II and III, 3187 PG II and III, 3188 PG II and III, 3189 PG II and III, 3190 PG II and III, 3200, 3205 PG II and III, 3206 PG II and III, 3208 PG I, II and III, 3209 PG I, II and III, 3317, 3341 PG II and III, 3342 PG II and III, 3364, 3365, 3366, 3367, 3368, 3369, 3376, 3395 PG II and III, 3396 PG II and III, 3397 PG II and III, 3398 PG I, II and II, 3399 PG I, II and II, 3401, 3402, 3403, 3404, 3413 PG I, II and III, 3414 PG I, II and III, 3448 PG I and II, 3449, 3450 and 3482.

Insert a new PPyy "For sea transport of UN Nos... bags are not allowed." against the following entries:

1340, 1374 PG II, 1378, 1382, 1390, 1393, 1394, 1395, 1396 PG II and III, 1396 PG II and III, 1398, 1400, 1401, 1402 PG II, 1403, 1405 PG II and PGIII, 1409 PG II, 1417, 1418, 1436 PG II, 2624, 2805, 2813 PG II, 2830, 2835, 3078, 3131 PG II, 3132 PG II and III, 3134 PG II, 3170 PG II and 3208 PG II and PG III.

insert a new PP zz "For sea transport of UN Nos.... flexible, fibreboard or wooden packagings shall be sift-proof and water–resistant or shall be fitted with a sift-proof and water-resistant liner" against the following entries:

1309, 1323, 1333, 1376, 1408, 1435, 1449, 1457, 1472, 1476, 1483, 1509, 1516, 1567, 1869, 2210, 2793, 2858, 2878, 2950, 2968, 3089, 3096 and 3125

Consequential amendments:

P001: Insert:

"PP xx For sea transport of UN Nos. 1553, 1693, 1694, 1699, 1701, 2478, 2604, 2785, 3148, 3183, 3184, 3185, 3186, 3187, 3188, 3398 (PG II and III), 3399 (PG II and III), 3413 and 3414, packagings shall be hermetically sealed."

P002: Insert:

"PPxx For sea transport of UN Nos. 1362, 1463, 1565, 1575, 1626, 1680, 1689, 1698, 1868, 1889, 1932, 2471, 2545, 2546, 2881, 3048, 3088, 3170, 3174, 3181, 3182, 3189, 3190, 3205, 3206, 3341, 3342, 3448, 3449 and 3450, packagings shall be hermetically sealed.

PPzz For sea transport of UN Nos. 1309, 1323, 1333, 1376, 1435, 1449, 1457, 1472, 1476, 1483, 1509, 1516, 1567, 1869, 2210, 2858, 2878, 2950, 2968, 3089, 3096, 3125 flexible, fibreboard or wooden packagings shall be sift-proof and water resistant or shall be fitted with a sift-proof and water resistant liner."

PP003: Insert:

"PPzz For sea transport of UN Nos. 1408 and 2793 flexible, fibreboard or wooden packagings shall be sift-proof and water resistant or shall be fitted with a sift-proof and water resistant liner."

P401: Insert:

"PPxx: For sea transport of UN Nos. 1183, 1242, 1295, 2965 and 2988, packagings shall be hermetically sealed."

P402: Insert:

"PPxx For sea transport of UN Nos. 1389, 1391, 1392, 1420, 1421, 1422, 3148, 3184 (PG II), 3185 (PG II), 3187 (PG II), 3188 (PG II), 3398 (PG I), 3399 (PG I) and 3482, packagings shall be hermetically sealed."

P403: Insert:

"PPxx For sea transport of UN Nos. 1360, 1397, 1402 (PG I), 1404, 1407, 1409, 1410, 1413, 1414, 1415, 1418 (PG I), 1419, 1423, 1426, 1427, 1428, 1432, 1433, 1714, 1870, 2010, 2011, 2012, 2013, 2257, 2463, 2806, 2813 (PG I), 3208, 3209, 3401, 3402, 3403 and 3404, packagings shall be hermetically sealed, except for solid fused material."

P404: Insert:

"PPxx For sea transport of UN Nos. 1383, 1854, 1855, 2008, 2441, 2545, 2546, 2846, 2881 and 3200, packagings shall be hermetically sealed."

P405: Insert:

"PPxx For sea transport of UN 1381, packagings shall be hermetically sealed."

P406

"PPxx For sea transport of UN Nos. 1310, 1320, 1321, 1322, 1336, 1337, 1344, 1347, 1348, 1349, 1354, 1355, 1356, 1357, 1517, 1571, 2555, 2556, 2557, 2852, 3317, 3364, 3365, 3366, 3367, 3368, 3369, 3370 and 3376, packagings shall be hermetically sealed."

P410: Insert:

"PPxx For sea transport of UN Nos. 1326, 1339, 1340, 1341, 1343, 1352, 1358, 1373, 1374, 1378, 1379, 1382, 1384, 1385, 1390, 1393, 1394, 1400, 1401, 1405, 1417, 1431, 1437, 1871, 1923, 1929, 2004, 2008, 2318, 2545, 2546, 2624, 2805, 2813, 2830, 2835, 2844, 2881, 2940, 3078, 3088, 3170 (PG II), 3182, 3189, 3190, 3205, 3206, 3208 and 3209, packagings shall be hermetically sealed.

PPyy For sea transport of UN Nos. 1340, 1374 PG II, 1378, 1382, 1390, 1393, 1394, 1395, 1396 PG II and III, 1396 PG II and III, 1398, 1400, 1401, 1402 PG II, 1403, 1405 PGIII, 1409 PG II, 1417, 1418, 1436 PG II, 2624, 2805, 2813 PG II, 2830, 2835, 3078, 3131 PG II, 3132 PG II and III, 3134 PG II, 3170 PG II and 3208 PG III bags are not allowed."

P503: Insert:

"PPxx For sea transport of UN 2626, packagings shall be hermetically sealed."

IBCs

Table 3.2, Column 9

Insert a new special packing provision "Bx" to the following entries:

1309, 1376, 1390, 1393, 1394, 1396, 1400, 1401, 1402, 1405, 1417, 1483, 1869, 1932, 2008, 2545, 2546, 2624, 2793, 2813, 2830, 2878, 2881, 3078, 3170, 3189 and 3208.

IBC 08:

Insert a new special packing provision Bx as follows:

"Bx For transport by sea of UN Nos. 1309, 1376, 1390, 1393, 1394, 1396, 1400, 1401, 1402, 1405, 1417, 1483, 1869, 1932, 2008, 2545, 2546, 2624, 2793, 2813, 2830, 2878, 2881, 3078, 3170, 3189 and 3208 flexible, fibreboard or wooden IBCs shall be sift-proof and water resistant or shall be fitted with a sift-proof and water resistant liner."

Large packagings

Table 3.2, Column 9

Add a new special large-packing provision "Lx" to PGIII entries of UN Nos. 1309, 1376, 1483, 1869, 2793 and 2878.

Add a new special large-packing provision Ly to PG III entries of UN Nos. 1932, 2008, 2009, 2545, 2546, 2881 and 3189.

LP02

Insert the new special packing provisions as follows:

"Lx For sea transport of UN Nos. 1309, 1376, 1483, 1869, 2793, 2858 and 2878, flexible or fibre inner packagings shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner.

Ly For sea transport of UN Nos. 1932, 2008, 2009, 2545, 2546, 2881 and 3189 flexible or fibre inner packagings shall be hermetically sealed."

Proposal 2: Amendment of the Guiding Principles [English only]

Amend 4.1 of the guiding principles as follows: (New text is underlined)

General provisions:

1. Packing instructions should be clear and provide as wide a choice of packagings as possible.

2. The packing instructions consist of a small number of general instructions supplemented by a limited number of more specific instructions for particularly hazardous or specialized dangerous goods.

3. Packing instructions should be developed with the objective of being suitable for multimodal transport. More severe packaging restrictions, in some instances, may be necessary for mode specific regulations. For maritime transport particularly the presence of the aquatic environment, air moisture and the problems of condensation involved in the changes in vessels in geographic areas with very different climates may require for some substances stricter provisions with regard to the water resistance and the tightness of packagings.

4. A rationalized approach (based on similar properties or hazards presented) should be used for allocating packing instructions to specific substances.

5. The packing instructions are primarily intended for the person preparing the package for consignment. They should not address classification or operational provisions

The packing instruction structure

There are packing instructions for:

- Packagings, prefixed by "P". Included are:

  – Packagings in accordance with Chapter 6.1 (up to 450 l and/or 400 kg net, as appropriate).

  – Pressure receptacles in accordance with Chapter 6.2.

  – Packagings for Division 6.2 substances in accordance with Chapter 6.3.

  – Packagings or packing methods not subject to the provisions of Chapters 6.1, 6.2, 6.3, 6.5 or 6.6.

  – IBCs, prefixed by "IBC", up to 3 m3 (intermediate bulk containers in accordance with Chapter 6.5);

  – Large packagings, prefixed by "LP", exceeding 400 kg net or 450 l (large packagings in accordance with Chapter 6.6).

The majority of substances and articles, excluding Classes 1, 2 and 7, have been allocated to a packing instruction beginning "P00*". When considering new packing instructions the use of one of these numbers should be considered first; class specific packing instructions should only be used when there is need for restricted packaging options or extensive special conditions. The exception to this rule is P004 to which fuel cell cartridges containing dangerous goods of different Classes are assigned.

Where the "P00*" instructions cannot be used then there are series of class specific packing instructions all beginning with the class number. In some cases it will be necessary to indicate in the Packing Instruction that in addition to the permitted design types packages and any quantity thresholds that are specified, there are some "Additional Requirements" that apply for all substances or articles assigned to that packing instruction. An example is the requirement to protect cells and batteries against short circuit as may be found in Packing Instruction P801 or P903. Some packing instructions may need to include provisions which are relevant only for a small number of substances or articles among many others that are assigned to a particular Packing Instruction. These are referred to as special packing provisions and because these are indicated in Column 9 of the Dangerous Goods List they are individually numbered as PPxx. An example is PP28 which is specific to Perchloric Acid in Packing Instruction P502. Some, such as PP26 which requires packagings to be lead free, will appear in more then one Packing Instruction with the same

number since the requirement is the same but the UN numbers to which it applies are different. Usually, the packaging provisions apply in all modes, an example is PP 31 which requires hermetically sealed packagings. However, some, such as PPxx which requires hermetically sealed packagings for transport by sea, is specifically designated to one mode.

Where a solid or liquid substance can only be transported in a cylinder then allocation to Table 3 of P200 shall be considered.

[...]